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ABSTRACT

This study examined the connection between persistence behavior and beliefs about one's own likely or potential performance. Undergraduates (N=114) in teacher education were asked to write test items for weekly topics in a one-semester educational psychology course, based on information conveyed in lectures and text. Subjects could write as many or as few items per week as they chose for 10 weeks. Improvements in grades would be given for the number of items written relative to other subjects. Subjects were told how many points they had earned and were never told where they stood relative to others. At the start of each week, subjects estimated how many items they would write that week and how sure they were about their estimate (perceived self-efficacy), and how important it was and how likely it was that they would earn a bonus in their grade for item-writing (outcome expectations). Responses were used to classify subjects into high, medium, and low self-efficacy groups. Performance on the item-writing task was compared for the three groups over time. The results showed that those who believed they would put in effort and do the work actually did even more than they anticipated doing, while those who expected to do little actually did even less. The findings suggest that there are three distinct groups of performers who differ greatly in their persistence on a self-regulatory task. It was concluded that self-regulated performance is a legitimate motivationally based phenomenon that can be studied, and that students vary greatly in the degree to which they engage in self-regulated performace. (NB)

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The Relation Between Beliefs and Self-Regulated Performance

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Dealing with the problems of one's environment requires more than simply knowing what to do. It requires the capability and motivation to self-regulate, that is, to control one's own behavior. Bandura (1982) has shown that people who do not believe they can exercise adequate control over their own actions tend to undermine their own efforts to cope with demanding situations. Weiner and Kukla (1970) have shown that individuals high in achievement motivation, i.e., who have the will to succeed, believe that the difference between failure and success is a function of the amount of effort one has expended towarded attaining success, while those low in achievement motivation attribute failure to a lack of ability.

Hence, believing in oneself and one's capability to succeed is expected to have a strong effect on the extent to which one chooses to act in a particular situation. Similarly, desiring success and believing that effort is the key to success is also expected to affect the choice for action. Finally, as contended by Rotter (1954) and Kirsch (1982), the value or importance and expectancy of the payoff for action must also be factored in as a determinant of the choice to take

action or what we are calling here self-regulated performance.

Most of the self-regulatory tasks and enterprises that individuals undertake require persistence for their successful completion. Persistence implies not only the willingness to spend time and expend effort beyond the ordinary but to withstand discomfort and face failure as well (Carroll, 1963). Common activities ranging from the successful completion of an academic course to giving up smoking or sustaining a diet all require the application of persistence. Establishing a motivational basis for persistence, therefore, would be not only of theoretical value but of potentially great practical value in fields such as education and counseling.

One of our major motivational constructs is perceived self-efficacy as proposed by Bandura (1977). Perceived self-efficacy refers to one's belief in one's capability or skill necessary to attain a particular goal or execute a particular performance. Bandura has proposed that perceived self-efficacy can explain not only the choice or level of activity to engage in but the likelihood that one will persist to successful completion (Bandura, 1986). However, the research evidence bearing on this point is mixed. While studies carried out by Schunk (1981, 1982, 1983) on children suggest some overlap between persistence and perceived self-efficacy, other studies (Relich et al., 1985; Sexton and Tuckman 1988), have failed to show a clear link between these two variables.

Most of the research on perceived self-efficacy as a cause of either choice of performance has either been contrived and short-term or uncontrolled and long-term. Studies like those carried out by Schunk

have involved highly "unreal" tasks to be performed over the duration of one laboratory period while other studies (e.g., Lent et al., 1984, 1986) have involved naturally-occurring real tasks over longer periods but the researchers have not been able to control factors affecting other potential motivating variables such as outcome expectations. Outcome expectations represent what one expects to receive or gain as a result of successful task completion and, according to Kirsch (1982), are a source of motivation equal in importance to perceived self-efficacy beliefs. In addition, recent work by Sexton and Tuckman (1988) has shown that beliefs about immediate past performance are a major determinant of the tendency for subjects to persist on a task.

In a classroom setting at virtually any level, teachers attempt to control student behavior through the use of direct instructions and rules, mandated and required assignments, grades, and a variety of punishments and rewards. Hence, the regulation of performance is extrinsic, that is, it comes from outside the student. This has the potential effect of taking motivation out of the hands of the student and making it a function of the reward for success or penalty for failure. Students may not have the opportunity to learn about or develop their own internal motivation based on either their beliefs about their own capabilities (Bandura, 1982) or their belief in their own effort as a causal determinant of success (Weiner and Kukla, 1970). Once school is completed and students are removed from the influence of the teacher, the failure to develop intrinsic motivation may be a severe handicap in controlling their own subsequent, adult behavior.

Problem

The present study attempted to establish the connection between persistence behavior, that is, sustained performance over time on a self-regulatory task, and beliefs or perceptions of one's own likely or potential performance. Its principal features were that (1) it involved a task that had meaning for the subjects in the context in which it was used, i.e., it was done in the classroom as part of an actual course rather than in a laboratory; (2) the basis by which subjects could judge their outcome expectations, that is, likelihood of gaining something for their performance, was controlled within the study; (3) the study extended over a ten-week period with performance occurring weekly (and therefore allowing for persistence), and (4) multiple measures of belief and attitudes were collected on an ongoing basis.

An attempt was made to compare the performance on an academic task over time by persons whose self-judgment of their likelihood to perform varied in order to determine whether (1) those who believed they would perform actually outperformed those who believed they would not perform, (2) believers and nonbelievers were equally accurate in predicting their performance over time, (3) whether other variables, such as outcome expectations, were related to the performance outcome (4) "predictive" constructs changed during the course of the performance, that is, whether the constructs that explained initial effort differed from those that explained effort in the middle and toward the end of the period, and (5) whether self-belief functioned as a motivational variable or as a personality variable that is, whether there were distinct, large and stable differences between performers and nonperformers on both

performance and on self-beliefs.

Methods

The self-regulated performance task was to write test items for weekly topics in a one-semester Educational Psychology course based on information conveyed in lectures and text. It was called the Voluntary Homework System or VHS. Subjects were 114 prospective teachers in their junior and senior years completing this required course which covered the topics of test construction and interpretation and the application of learning theories to instruction. Subjects could write as many (up to 100) or few items (including zero) per week for 10 weeks and these items could be multiple choice (worth 2 points each) or completion-type (worth 1 point each). Ss were told that the top-third (cumulatively) point scorers would receive a bonus of two "notches" or steps in their final course grade (e.g., from a B to a A-) while the middle-third point scorers would receive a one notch bonus (e.g., from a B to a B+) and the low-third point scorers no bonus. Ss were only told how many points they themselves have earned and never told where they stood relative to the performance of others.

At the start of each week, Ss completed a "personal reaction form" on which they estimated (1) how many items they would write that week and how sure they were about their estimate (perceived self-efficacy), and (2) how important and how likely it was to them to earn a bonus in their grade for item writing (outcome expectations). Based on responses to the self-efficacy questions, Ss were classified into high, medium, and low self-efficacy groups. Performance on the item-writing task was

then compared for the three groups over time using analysis of variance. In the subsequent analysis, Ss were divided into high, medium and low performance groups based on the number of items written and the three groups were compared on level of self-efficacy. The intent was not merely to determine whether self-efficacy and performance were related, although this in itself is worthy of documentation in the classroom setting, but to see whether the relationship between these variables differed for persons at the different levels of each. In other words, the purpose of the analyses was to see if there were stable self-regulatory performance styles and, if so, whether persons displaying the different styles differed in self-efficacy. To further explore this connection, microanalysis as described by Bandura (1980) was also employed.

Results

By Self-Efficacy Group. A three efficacy group (high, medium, and low) by 10 week analysis of variance was run on the performance measure, number of test items written,yielding a significant effect for both efficacy group ($F = 43.97$, $p < .001$) and time ($F = 17.72$, $p < .001$). Means and standard deviations are shown in Table 1.

The high self-efficacy group, i.e., those who believed that they would write the most items, averaged approximately 22 items per week for the first four weeks,* and 49 items per week for the remaining six weeks. The medium self-efficacy group averaged 11 1/2 items per week

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* The course mid-term exam was given at the end of the 4th week.

for the first 4 weeks and 19 items per week for the remaining six weeks. The low self efficacy group, i.e., those who believed they would write the least items, averaged 4 items per week for the first four weeks and 3 3/4 items per week for the last six weeks. Clearly, the belief that one would write items was related to the number of items written. Writing more went along with believing more and writing less when along with believing less.

Since the self-belief measure was made up of two components: the exact number of items you expected to write, and your certainty that you would write that many, it was possible to take the first component, the expected number, and compare that to the number actually written using the technique Bandura (1980) calls microanalysis. This revealed that the high efficacy group, despite writing so many items, actually underestimated the number they would write on eight of the 10 trials by an average of 22%. The middle efficacy group, as well, underestimated the number of items they would write on nine of the 10 trials by an average of 27%. However, the low efficacy group overestimated the number of items they would write on nine of the 10 trials by an average of 77%. Hence, despite believing that they would write few items, Ss in this last group consistently wrote even fewer items than they said they would write while Ss in the two groups that believed they would write more items, consistently wrote even more items than they predicted they would write.

On the measure of self-efficacy, the high group started out at 88 and ended up at 366 (a 316% increase) with progressive increases every week. The middle group started out at 71 and ended up at 112 (a 58%

increase) but the level went up for six weeks, down for three, then up again for the last. The low efficacy group went from 44 to 47 (a 7% increase) but actually went down consistently to a low of 7 in week nine and then jumped to 47 in week 10.

Finally on the measure of outcome expectations (a combination of the perceived likelihood and importance of getting a grade bonus), the high efficacy group stayed almost exactly the same over the 10 weeks at a level of 48; the middle efficacy group went progressively down from 45 to 32; and the low efficacy group went progressively down from 30 to 9 (in week nine) and then jumped to 28 in week 10.

By Performance Group. Overall item writing or self-regulated performance varied greatly across the total group of Ss. Students in the highest third averaged over 450 items in the 10 weeks or about 45 items a week, while middle third students averaged a total of 120 or 12 items a week, and low third students 13 in total or a little over 1 item per week. The performance difference between each group was quite large and stable over time. Thus, there were considerable differences between students in terms of self-regulated performance. About a third of the students chose to devote considerable effort to the voluntary activity while another third chose to devote essentially no effort at all.

In terms of microanalysis, the high performers believe they would write about 32 items per week (in contrast to the 45 they wrote); the middle performers believed they would write about 16 items per week (in contrast to the 12 they wrote); the low performers believed they would write 8 items per week (in contrast to the 1.3 they wrote). All

performance group differences in how many items they believed they would write were highly significant ($F = 59.27$, $p < .001$) as was the effect of time ($F = 12.42$, $p < .001$. Means and standard deviations are shown in Table 2. Also, the discrepancy by performance group between what they believed they would write and what they actually did write were quite large and stable over time. Hence, the high performers were the high believers and the low performers the low believers yet the high performers, despite their high beliefs, actually wrote even more items than they believed they would while the middle and especially the low performers, despite their low beliefs, actually wrote even fewer items than they believed they would write. In other words, low performers must have said: "This week I'm going to really write items", and then, despite their resolve, continued to fail to act. High performers, on the other hand, might have said: "This week I'll probably write as many items as last week", and then, after getting into it, ended up writing even a few more.

Discussion

It was concluded that while a correspondence existed between what people believed they would do (perceived self-efficacy) and what they actually did, thus supporting Bandura's theory, the overlap was less than perfect. Furthermore, distinguishing between believers (high self-efficacy) and nonbelievers (low self-efficacy), something that has not been done in previous research, revealed that believers actually did more than they thought they would while nonbelievers did less. In other words, those who believe that they will put in the effort and do the work

TABLE 1

MEAN NUMBER OF ITEMS WRITTEN (AND STANDARD DEVIATIONS) FOR LOW, MEDIUM AND HIGH SELF-EFFICACY GROUPS OVER THE 10 WEEKS

	TIME (WEEKS)									
GROUP										
LOW EFFICACY	5.6 (9.2)	2.9 (4.8)	3.3 (6.6)	4.2 (8.9)	2.9 (9.2)	2.7 (5.7)	3.6 (7.6)	2.2 (6.0)	4.4 (6.2)	6.6 (12.4)
MEDIUM EFFICACY	8.5 (12.1)	8.8 (13.5)	18.9 (18.4)	9.7 (12.7)	19.6 (26.7)	21.1 (29.1)	18.4 (26.4)	18.9 (25.9)	13.5 (24.5)	28.3 (36.8)
HIGH EFFICACY	17.6 (21.1)	22.5 (18.6)	29.3 (25.1)	18.8 (22.6)	42.7 (35.8)	39.0 (32.6)	50.9 (35.2)	52.3 (34.8)	49.4 (36.8)	59.2 (38.3)

TABLE 2

MEAN SELF-EFFICACY SCORES (AND STANDARD DEVIATIONS) FOR LOW, MEDIUM, AND HIGH PERFORMERS OVER THE 10 WEEKS

	TIME (WEEKS)									
GROUP										
LOW PERFORMERS	56.9 (53.6)	47.5 (40.4)	45.5 (44.3)	39.92 (63.5)	41.00 (42.4)	38.9 (45.1)	24.4 (34.4)	16.2 (32.3)	9.4 (26.2)	64.2 (88.9)
MEDIUM PERFORMERS	67.11 (51.2)	77.7 (63.8)	77.1 (50.2)	83.6 (63.1)	99.7 (79.5)	136.9 (187.2)	96.3 (99.3)	114.9 (140.1)	57.1 (88.6)	102.1 (101.6)
HIGH PERFORMERS	78.6 (56.2)	105.81 (117.6)	146.4 (111.7)	132.0 (89.9)	153.5 (99.8)	190.4 (150.0)	251.5 (198.2)	304.6 (222.6)	349.7 (249.6)	363.7 (287.9)

actually do even more than they anticipate doing, while those who expect to do little actually do even less.

It was also concluded that self-regulated performance is a legitimate motivationally-based phenomenon that can be studied and applied in an educational setting, and that students vary greatly in the degree to which they engage in self-regulated performance. The motivational basis for self-regulated performance lies in a set of beliefs which seem to center on the perception one has of one's capacity and likelihood to perform, rather than one's value for the performance incentive and the expected likelihood of getting it.

An important question, however, needs to be answered, namely: whether believing causes performance (as in "conceive it, believe it, achieve it") or whether people are merely aware of whether they are good or poor performers (i.e., performance causes self-awareness). If believing causes performance, we need to determine how to change nonbelievers into believers. If, however, performance precedes awareness, then we are dealing with a preformed characteristic that is more like a personality trait than a motive.

The results suggest that there are three distinct groups of performers who differ greatly in their persistence on a self-regulatory task. The high group members seem to treat the task as an involuntary one and to perform on it even beyond their own expectations or intentions while the low group members seem to be chronic procrastinators with good intentions but little follow through. The middle or perhaps "swing" group seems to follow most closely the link between self-belief and behavior that Bandura and others have

hypothesized and indeed found. Only by trisecting the total group does one reveal what the averaging process obscures, namely that there are different performance "styles" with differing connections to self-beliefs.

Since advanced college students bring with them a performance history and undoubtedly a well-developed set of beliefs about their own capabilities and causal attributes of success, their self-regulated performance tendencies seem to have been already developed and appear almost as an automatic response to the action choice situation. The beliefs which accompany the behavior may no longer be regulating the behavior if, in fact, the behavior is as automatic as it appears. Subsequent studies are now being undertaken to determine how the behavior of self-regulated performance may be increased by trying to change either the beliefs that accompany it or the surrounding conditions. It would be quite useful to provide college students in general and prospective teachers in particular with motivational enhancement and self-development as a by-product of their collegiate experience.

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